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Chromosome Studies Including a Report of B-Chromosome in a Wild Silkmoth, *Sonthonnaxia maenas* (Doubleday) (Saturniidae:Saturniinae)

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Abstract. The diploid chromosome number in *Sonthonnaxia maenas* (Doubleday), a wild silkmoth from India, is 62 and is being reported for the first time. The mitotic and meiotic interphases in female show a prominent, positively heteropycnotic body (sex chromatin). Besides a B-chromosome has also been discovered in two individuals and its behaviour during mitosis and meiosis has been described.

Introduction

The genus *Sonthonnaxia watson* comes under the group of tailed silkmoths of the tribe Saturniini, with two other genera, *Actias* and *Proactias* (see Arora and Gupta, 1979). *S. maenas* forms a papery, open, pale-gold-colored cocoon, the silk of which has not been commercially exploited. It is distributed in northeastern India extending into Bhutan, China and Burma, etc. (Arora and Gupta *loc. cit.).*

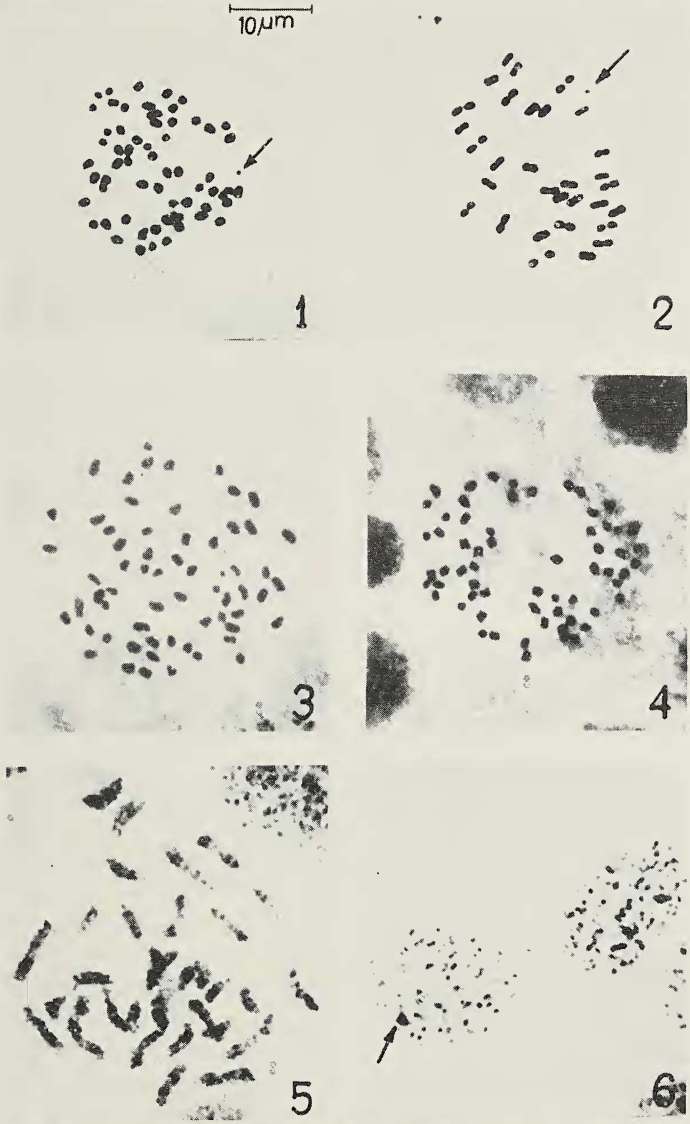
The present paper, which forms the first report in the genus *Sonthonnaxia* for chromosome cytology, includes studies on chromosome complement, sex chromatin, meiotic mechanism and B-chromosome in both the sexes.

Material and Methods

The cocoons used in this study were collected during October-November, 1979 from Khasi Hills, Meghalaya, at an altitude of about 4000 feet. The chromosome preparations were made from 2 ♂♂ and 1 ♀ pupae by heat-dried suspension method described earlier (Narang and Gupta, 1979a). However, before staining in 2-5% Giemsa buffered at pH 6.8, the slides were dipped in glacial acetic acid for 30 seconds to reduce the cytoplasmic staining. Some cocoons were also kept for emergence for taxonomic purposes.

Observations

The diploid chromosome number in both the sexes is invariably 62 as studied at metaphases in 36 cells including 12 spermatogonial (Fig. 1), 17 male meiotic I (Fig. 2), 4 oogonial (Fig. 3) and 3 female brain cells



Figs. 1-6. Photomicrographs of chromosomes of *Sonthonnaxia maenas*.

Fig. 1. Spermatogonial metaphase showing 62 chromosomes and a B-chromosome (arrow).
Fig. 2. Metaphase I (♂) showing 31 bivalents and a B-chromosome (arrow).
Fig. 3. Oogonial metaphase showing 62 chromosomes.
Fig. 4. Mitotic metaphase from brain cell (♀).
Fig. 5. Late pachytene (♀) with 31 achiasmatic bivalents.
Fig. 6. Sex chromatin (arrow) in interphases (♀ germ cells).

(Fig. 4). All the chromosomes intergrade in length. In the males at metaphase I (Fig. 2) the bivalents appear dumb-bell shaped with terminalized chiasmata while in the female, they are achiasmate, as observed at prophase (Fig. 5).

A spheroid, positively heteropycnotic body (sex chromatin) has been observed in interphase cells of gonads (Fig. 6) and brain in the female; in the polyploid cells, however, 2 to 4 such bodies or a single large fused one, have been observed.

A single supernumerary or B-chromosome has also been found to be present in all the mitotic (Fig. 1), prometaphase and metaphase I (Fig. 2) cells in both the males studied. In the lone female studied, the B-chromosome was not observed in any of the seven cells at mitotic metaphase. The B-chromosome shows the following characteristics: 1) its size is much smaller than the smallest chromosome of the normal complement, 2) it exhibits negative heteropycnosis at metaphase I and 3) it does not associate with any of the chromosomes of the complement.

Discussion

The chromosome number in *Sonthonnaxia maenas* is n = 31 which also corresponds to the modal number, suggested for the genera, *Actias, Antheraea* and *Cricula* of the tribe Saturniini (Narang and Gupta, 1979a). The positively heteropycnotic sex chromatin present in the interphase cells of the female of *S. maenas* is likely to represent the Y chromosome as suggested earlier for some other silkmoths (Gupta and Narang, in press). However, sex chromatin is absent in females of another tailed silkmoth, *Actias selene* (Gupta and Narang *loc. cit.*), the chromosome number of which in females is yet to be discovered.

The single extra chromosome present in *S. maenas*, found in all cells of two out of the three individuals studied, has been interpreted as a B-chromosome on the basis of following evidences: 1) very small size unlike the other chromosomes, 2) non-homology with the other chromosomes as evident by absence of any association with them and 3) its peculiar heterochromatic nature characterized by negative heteropycnosis at metaphase I. The B-chromosome of this species, however, seems to be mitotically stable since its number has been found to be invariably one in all the mitotic and meiotic I cells studied. This is the first clear report of B-chromosome in Saturniidae. However, supernumeraries or B-chromosome have also been reported in some species of the Pieridae (*vide* Bigger, 1978) and one species (*Euphydryas colon*) of Nymphalidae (Pearse and Ehrlich, 1979).

Further studies on population cytogenetics of different Saturniids, making use of the available modern smear techniques, are warranted to unravel the presence of B-chromosomes.

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